

Module - 1

Chapter 1 : Introduction to Automation

1-1 to 1-8

Syllabus : Definition and fundamentals of automation, Elements of Automated system, Automation principles and strategies, Levels of automation, types of automation, Advanced automation functions

1.1	Introduction, Definition and Fundamentals of Automation.....	1-1
1.1.1	Early Stages of Development	1-1
1.1.2	Fundamentals of Automation	1-3
1.2	Elements of Automated System	1-3
1.3	Automation Principles and Strategies	1-5
1.4	Levels of Automation	1-6
1.5	Types of Automation	1-7
1.6	Advanced Automation Functions	1-8

Chapter 2 : Introduction to Artificial Intelligence

2-1 to 2-71

Syllabus : Introduction to Artificial Intelligence, Introduction, Historical development, Intelligent Systems, Types of Intelligent Agents, Components of AI, Foundations of AI, Scope of AI, Current trends in AI, Relevance to Mechanical Engineering

2.1	Introduction to Artificial Intelligence	2-1
2.1.1	Types of AI.....	2-2
2.1.2	History of AI.....	2-3
2.1.3	Comparison of AI with Data Science	2-4
2.1.4	Approaches to AI.....	2-4
2.1.4(A)	Symbolic.....	2-6
2.1.4(B)	Sub-symbolic (Connectionist Approach)	2-8
2.1.4(C)	Statistical	2-10
2.2	Intelligent Agents (Systems).....	2-10
2.2.1	Types of Intelligent Agents.....	2-14
2.3	Components of AI	2-17
2.4	Foundations of AI.....	2-19
2.5	Current Trends in AI	2-19
2.6	Application of Machine Learning and Artificial Intelligence (Scope of AI)	2-20
2.7	Concept Building - Internet of Things (IoT)	2-28
2.7.1	Characteristics of IoT.....	2-29

2.8	IoT Vision	2-31
2.9	IoT and M2M	2-37
2.9.1	Introduction to M2M	2-37
2.9.1(A)	Applications of M2M.....	2-38
2.10	Things in IoT	2-38
2.11	Sensors, Actuators, and Smart Objects	2-40
2.11.1	Sensors	2-40
2.11.2	Types of Sensors.....	2-43
2.11.2(A)	Humidity Sensor	2-46
2.11.2(B)	Level Sensors.....	2-47
2.12	Actuators	2-48
2.12.1	Types of Actuators.....	2-48
2.13	Smart Objects	2-49
2.13.1	Common Smart Objects (IoT Devices).....	2-50
2.13.1(A)	Home Automation.....	2-50
2.13.1(B)	Industrial IoT	2-51
2.13.1(C)	Personal and Health Care.....	2-53
2.13.1(D)	Other Uses.....	2-53
2.14	Relevance of AI in Mechanical Engineering	2-54
2.15	Human Machine Interaction (Connected Factory)	2-55
2.16	Predictive Maintenance and Health Management (Prognostics)	2-57
2.17	Fault Detection (Machine Diagnosis and Prognosis)	2-61
2.18	Dynamic System Order Reduction (Model Order Reduction (MOR))	2-63
2.18.1	Image Based Part Classification.....	2-64
2.18.2	Process Optimisation.....	2-65
2.18.3	Material Inspection	2-66
2.18.4	Tuning of Control Algorithms	2-69

Module - 2

Chapter 3 : Design of Pneumatic and Hydraulic Circuits

3-1 to 3-23

Syllabus : Design of Pneumatic sequencing circuits using Cascade method and Shift register method (up to 2 cylinders) ,Basic Hydraulic Circuits : Meter in, meter out and Bleed off circuits; Intensifier circuits, Regenerative Circuit, Counter balance valve circuit and sequencing circuits

3.1	Fluid Power	3-1
3.2	Pneumatic System	3-1

3.2.1	Components of Pneumatic Systems.....	3-2
3.3	Design of Pneumatic Sequencing Circuits using Cascade Method.....	3-6
3.4	Design of Pneumatic Sequencing Circuits using Shift Register	3-11
3.5	Hydraulic System	3-12
3.5.1	Applications of Hydraulic Systems	3-12
3.5.2	Advantages and Disadvantages of Hydraulic Systems	3-13
3.5.3	Hydraulic System Components	3-13
3.6	Flow Control Circuit	3-17
3.6.1	Meter-in Circuit	3-17
3.6.2	Meter-Out Circuit	3-18
3.6.3	Bleed-off Flow Control Circuit	3-18
3.7	Hydraulic Intensifier.....	3-19
3.8	Regenerative Circuit.....	3-20
3.9	Counter Balance Hydraulic Circuit	3-21
3.10	Sequencing Circuit	3-21

Module - 3

Chapter 4 : Electro-pneumatic Circuits and PLC Discrete Control Systems

4-1 to 4-13

Syllabus : Electro-pneumatic Circuits : Design of Electro-Pneumatic Circuits using single solenoid and double solenoid valves; with and without grouping; **PLC Discrete Control Systems** : Design of Pneumatic circuits using PLC Control (ladder programming only) up to 2 cylinders, with applications of Timers and Counters and concept of Flag and latching.

4.1	Design of Electro-Pneumatic Circuits using Single Solenoid and Double Solenoid Valves; with and without Grouping	4-1
4.1.1	Solenoids	4-2
4.2	Circuit with Solenoid Control	4-4
4.3	PLC Programming.....	4-5
4.4	Ladder Diagrams	4-6
4.5	PLC Pneumatic Circuit Control.....	4-7
4.6	Timers.....	4-8
4.6.1	Need for Timer in a PLC.....	4-8
4.6.2	Timer Instructions	4-9

4.6.3	Timer Working.....	4-9
4.6.4	Types of timers.....	4-9
4.6.5	Timer On-Delay (TON).....	4-9
4.6.6	Timer Off-Delay (TOF).....	4-10
4.7	Counters.....	4-10
4.7.1	Count Up (CTU) and Count Down (CTD).....	4-10
4.8	Concept of Flag and latching.....	4-11

Module - 4

Chapter 5 : Robots and their Applications

5-1 to 5-18

Syllabus : Introduction to Robots, Types, Classifications, Selection of Robots, Robot Degrees of freedom, Robot configuration, Accuracy and repeatability, Specification of a Robot, Robot feedback controls: Point to point control and Continuous path control, Control system for Robot joint, Adaptive control, Drives and transmission systems, End effectors, Industrial robot applications, Nex-gen robots.

5.1	Introduction to Robots.....	5-1
5.1.1	Properties of Robots.....	5-2
5.2	Classification of Robots.....	5-2
5.3	Types of Robots.....	5-3
5.4	Selection of Robots.....	5-6
5.4.1	Selection criteria's of Robots.....	5-7
5.5	Degrees of Freedom and Robot Axis.....	5-8
5.6	Robotic Configurations.....	5-9
5.7	Accuracy and Repeatability.....	5-9
5.8	Specification of a Robot.....	5-10
5.9	Robot Feedback Controls.....	5-11
5.10	Adaptive Control.....	5-12
5.11	Drives and Transmission Systems.....	5-12
5.12	End Effector.....	5-13
5.13	Robot Joint Control System.....	5-15
5.14	Industrial Robot Applications.....	5-17
5.15	Next Generation Robots.....	5-17

Module 5

Chapter 6 : Problem Solving

6-1 to 6-16

Syllabus : Tree and Graph Search, Uninformed v/s informed search, uninformed methods: depth first search, breadth first search, Informed search: heuristic search, Best first search, branch and bound

6.1	Measuring Performance of Problem Solving Algorithm / Agent	6-1
6.2	Node Representation in Search Tree	6-2
6.3	Uninformed Search	6-2
6.3.1	Difference between Informed and Uninformed Search Techniques	6-2
6.4	Depth First Search (DFS).....	6-3
6.4.1	Concept	6-3
6.4.2	Process	6-3
6.4.3	Implementation.....	6-4
6.4.4	Algorithm.....	6-4
6.4.5	Performance Evaluation	6-4
6.5	Breadth First Search (BFS)	6-5
6.5.1	Concept	6-5
6.5.2	Process	6-5
6.5.3	Implementation.....	6-5
6.5.4	Algorithm.....	6-6
6.5.5	Performance Evaluation	6-6
6.6	Difference between BFS and DFS	6-6
6.7	Informed Search Techniques.....	6-7
6.8	Heuristic Function	6-7
6.8.1	Example of 8-puzzle Problem	6-8
6.8.2	Example of Block World Problem.....	6-9
6.8.3	Properties of Good Heuristic Function	6-11
6.9	Best First Search	6-11
6.9.1	Concept	6-11
6.9.2	Implementation.....	6-12
6.9.3	Algorithm : Best First Search	6-12
6.9.4	Performance Measures for Best first search	6-13
6.9.5	Greedy Best First Search	6-13
6.9.6	Properties of Greedy Best-first Search	6-14

6.10	Branch and Bound	6-14
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Chapter 7 : Machine Learning	7-1 to 7-52
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Syllabus : Machine Learning, Introduction, Types of machine learning: supervised, unsupervised, reinforcement learning, Learning with Decision Trees, Introduction to Decision Trees, Classification and Regression Trees, Concept of ensemble methods : bagging, boosting, random forests, K means clustering algorithm, K nearest neighbours algorithm, Hierarchical clustering

7.1	Introduction to Machine Learning.....	7-1
7.1.1	How does Machine Learning Work?	7-3
7.1.2	Key Terms Associated with Machine Learning	7-5
7.1.3	Data Formats.....	7-5
7.1.4	DIKW Pyramid	7-6
7.1.5	Categories of Data Analytics.....	7-7
7.2	Types of Machine Learning	7-9
7.2.1	Supervised Learning	7-9
7.2.2	Unsupervised Learning.....	7-10
7.2.3	Reinforcement Learning.....	7-11
7.2.4	How to Choose the Right Machine Learning Algorithm?	7-12
7.2.5	Issues in Machine Learning	7-13
7.3	Steps in Developing a Machine Learning Application	7-14
7.4	Classification Model.....	7-19
7.4.1	Decision Trees	7-20
7.4.2	Key Terms and Concepts	7-21
7.4.2(A)	Entropy.....	7-21
7.4.2(B)	Information Gain	7-22
7.4.2(C)	Gain Ratio.....	7-22
7.4.2(D)	Gini Index	7-24
7.5	Decision Tree Algorithms	7-24
7.5.1	The General Algorithm	7-24
7.5.2	ID3 Algorithm	7-25
7.5.3	C4.5 Algorithm.....	7-29
7.5.4	CART (Classification and Regression Trees) Algorithm.....	7-30
7.5.5	Evaluating a Decision Tree	7-30
7.6	Additional Classification Methods.....	7-31
7.6.1	Bagging.....	7-31
7.6.2	Boosting	7-33

7.6.3	Random Forests	7-34
7.7	Clustering.....	7-35
7.7.1	Properties of a Cluster.....	7-36
7.7.2	Types of Clustering	7-37
7.7.3	Use Cases (Applications) of Clustering	7-37
7.7.4	K-means.....	7-39
7.7.5	Determining the Number of Clusters	7-40
7.7.6	Diagnostics	7-41
7.7.7	Reasons to Choose and Cautions (Drawbacks / Challenges).....	7-42
7.8	k-Nearest Neighbours (kNN) Classification Algorithm	7-43
7.9	Hierarchical Clustering	7-44
7.9.1	Dendrogram	7-44
7.9.2	Hierarchical Clustering Strategies (Algorithms).....	7-45
7.9.2(A)	Agglomerative Hierarchical Clustering.....	7-46
7.9.2(B)	Divisive Hierarchical Clustering	7-47
7.9.3	Agglomeration (Linkage) Methods.....	7-48

Chapter 8 : Regression Analysis and Neural Networks

8-1 to 8-55

Syllabus : Learning with regression, Linear regression, Logistic regression, Artificial Neural Networks, Concept of ANN, Basic Models of Artificial Neural Networks , Important Terminologies of ANNs , McCulloch-Pitts Neuron, NN architecture, Perceptron, Delta learning rule, Backpropagation algorithm, Gradient Descent algorithm, Feed forward networks, Activation functions, Introduction to AI Technologies in the realm of Automation, Concept of Natural Language Processing, Machine Vision, Deep learning, Expert systems, Genetic Algorithms, Industry 4.0

8.1	Regression Analysis	8-2
8.1.1	Linear Regression	8-2
8.1.1(A)	Use Cases (or Applications of) for Linear Regression	8-3
8.1.2	Logistic Regression	8-4
8.1.2(A)	Use Cases (or Applications of) for Logistic Regression	8-5
8.2	Reasons to Choose and Cautions	8-5
8.3	Additional Regression Models	8-6
8.4	Introduction to Neural Networks	8-6
8.4.1	Fundamental Concept	8-7
8.4.2	Biological Neuron	8-8
8.4.3	Evolution of Neural Networks (Hebb's Rule)	8-9
8.5	Artificial Neural Networks (ANN)	8-10
8.5.1	The Perceptron	8-11

8.5.2	The Bias Input	8-13
8.5.3	Multilayer Perceptron	8-13
8.5.4	Shallow and Deep Neural Network	8-14
8.6	Neural Network (NN) Architecture	8-15
8.7	Activation Functions	8-17
8.7.1	Types of Activation Functions	8-18
8.8	Learning Process	8-22
8.9	Backpropagation	8-23
8.9.1	How Backpropagation Works?	8-25
8.9.2	Forward Propagation	8-27
8.9.3	Error Derivative	8-28
8.9.4	Additional Derivatives	8-29
8.9.5	Backpropagation	8-30
8.10	Convolution Neural Network (CNN or ConvNets)	8-31
8.10.1	How do Convolutional Neural Networks Work?	8-31
8.10.2	Convolutional Layer	8-32
8.10.3	Pooling Layer	8-33
8.10.4	Fully-Connected Layer	8-34
8.10.5	Convolutional Neural Networks and Computer Vision	8-34
8.11	Optimisation Techniques	8-34
8.12	Derivative-based Optimisation (Gradient Descent Algorithm)	8-35
8.12.1	Characteristics of Derivative-based Optimisation Techniques	8-36
8.13	Delta Learning Rule	8-37
8.14	Introduction to AI Technologies in the Realm of Automation	8-37
8.15	Introduction to Text Analysis (Concept of Natural Language Processing)	8-37
8.15.1	Challenges in Text Analysis	8-37
8.15.2	Steps in Text Analysis	8-38
8.15.3	Text Pre-Processing Techniques	8-39
8.15.4	Bag-of-Words	8-42
8.15.5	Bag-of-n-Grams	8-43
8.16	Term Frequency - Inverse Document	8-43
8.16.1	Term Frequency (TF)	8-44
8.16.2	Inverse Document Frequency (IDF)	8-44
8.16.3	Machine Vision	8-44
8.16.4	Deep Learning	8-45

8.16.5	Expert Systems	8-45
8.17	Genetic Algorithms	8-45
8.18	Industry 4.0	8-47
8.18.1	Characteristics of an Industry 4.0 Business Environment	8-49
8.18.2	Building Blocks of Industry 4.0	8-50
8.18.3	Potential Benefits of Industry 4.0	8-52
